Chapter

AI-Powered Virtual Assistants in the Realms of Banking and Financial Services

Margherita Mori

Abstract

This chapter aims at providing a framework for analysis on evolutionary trends in finance that have to do with technological progress and especially with artificial intelligence (AI) applications. The starting point can be identified with a survey on how they have modified the business areas involving banking and financial services and on what can be expected – in terms of future strategic shifts and behavioral changes – on both the supply and the demand sides. The next step revolves around a wider and deeper investigation on the role that virtual assistants have started to – and are likely to further – play in the areas under scrutiny: special attention is requested upon the provision of enhanced customer service support, including conversational AI and sound branding; implications encompass developments that are on the cards, based upon digitalization as a must – not just an option – as shown by the Covid-19 pandemic. Conclusions allow to emphasize the significance, advancing features and value of this conceptual paper, as it leads to sort out best practices and success stories that are worth disseminating and replicating to benefit not only individuals and enterprises having direct interest in them, but society as a whole.

Keywords: AI applications, banking, conversational AI, digitalization, financial services, sound branding, virtual assistant

1. Introduction

Remarkable improvements in computer and telecommunication technology have fueled financial innovation worldwide in the last few decades and are key to most developments under way, that encompass institutional, product and process innovations: they deal with new types of financial firms (such as specialist credit card companies, electronic trading platforms and direct banks), new financial services (such as derivatives, asset-backed securities and foreign currency mortgages) and new ways of doing financial business (such as virtual, home and phone banking); in other words, all three pillars that the financial system is generally thought of being based on – namely: financial institutions, markets and products – have been positively affected, to the point that "many of the things that seemed so incredible 10 years ago are now foundational" [1]. Looking forward, the incredible pace of technology-driven change sounds promising for further progress, that may prove beneficial non only to financial institutions, but also to their counterparts across all economic sectors and geographical areas.

Within this framework, a major role needs to be assigned to artificial intelligence (AI), as a "multidisciplinary topic, where researches from multiple fields as neuroscience, computing science, cognitive sciences, exact sciences and different engineering areas converge" [2]. Related applications have gained momentum in the realms of banking and financial services, as well as in other industries, thus leading to state that getting involved in AI is a must, rather than just an option: reference points can be easily identified with "machines or systems that can perform complex tasks normally considered to require 'intelligence' and thus thought to be the preserve of humans" while the meaning of AI has been explained by evoking "a computer system that can sense, comprehend, act and learn"; as a result, it can be argued that "by enabling machines to interact more naturally – with their environment, with people and with data – the technology can extend the capabilities of both humans and machines far beyond what each can do on their own" [3], p. 3.

These thoughts pave the way for emphasizing the cross-cultural implications of AI, with its specific challenges and opportunities, and for discussing about it in terms of "systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience" [4]. Along this line of analysis, it comes natural to sort out most recent trends in this field, which sounds like an invitation to shed special light on AI-powered virtual assistants: they tend to be perceived as innovative tools that can help financial institutions and especially banks – as well as other enterprises – to provide customer service support and carry out administrative tasks, though the pertaining scope seems much wider; therefore, it is worth investigating how these digital assistants can be usefully resorted to and fully exploiting their potential, in sight of contributing to advances in the financial industry and particularly in the banking sector, due to its relevance and even prominence in many operating areas.

2. From "bricks" to "clicks"

To begin with, it must be accounted for the significant improvements in information technology that have been translated into new means of making banking and financial services available, including delivering them electronically: no surprise that e-finance has increasingly expanded, at a relatively fast pace, as financial institutions have quickly perceived the risk of becoming obsolete if this evolving trend would not be endorsed; a case in point has to do with the automated teller machine (ATM), that stands as a major form of an e-banking facility and that has enabled customers to get cash, make deposits, transfer funds from one account to another and perform other financial transactions all day long, without interacting with a human being. Not only the adoption of this facility has contributed to keep operating costs at relatively modest levels for banks, but more convenience has been provided to their customers.

Meanwhile, the drop in the cost of telecommunications has encouraged these financial intermediaries to develop other innovations, such as those that fall under the umbrella of home banking: it allows banks' customers to conduct many of their bank transactions without even leaving the comfort of home; in turn, banks have reaped benefits that stem from bearing substantially lower transaction costs compared to those implied by having customers come to their premises. The success of ATMs has been acting as a catalyst for the introduction and spread of other innovative facilities, including the automated banking machine, which can be described as a combination in one location of an ATM, an Internet connection to the bank's website and a telephone link to customer service [5], p. 500.

Further innovations in the financial industry – and notably in the home banking area – have been stimulated by the decline in the price of personal computers and the increase in their presence in households, thus laying the foundations for the virtual bank (also called digital-only and online-only bank) as a new type of banking institution: it delivers its services through the Internet or other forms of electronic channels – instead of conventional branches – and merely exists in cyberspace, which takes home banking one step further by enabling customers to have a full set of banking services available at home 24 hours a day; accordingly, the need for a physical location as the main vehicle to handle financial transactions has started to fade away – up to the point that many actual and potential bank customers do not even feel this need any more – and "clicks" have begun to replace "bricks" thanks to this evolutionary business model in the banking industry. However, pure Internet banks can hardly be conceived as the wave of the future, with a combination of "clicks" and "bricks" being expected to establish itself as the predominant format in the banking sector, whereby remote banking can usefully complement the banking services provided in line with traditional standards.

3. Progress in financial technology

Focusing on astonishing developments that have been recorded in financial technology – shortly fintech, a combination of finance and technology – proves rewarding to draw an updated picture of the global financial system, to be acknowledged as the largest industry in the world: as widespread evidence implies, most recent advances in this context have allowed financial institutions to satisfy the needs of their target markets in novel ways, that have shaken up the historically change-resistant banking sector, beyond expectations, and to serve potential customers that would otherwise populate the market segments consisting of the unbanked and underbanked [6]; thanks to progress in fintech, the financial industry has been experimenting with virtual banking, as well as – in more general terms – with automation, predictive analytics, new delivery platforms, blockchain and distributed ledger technology, to mention just a few innovations in the field under scrutiny. Promising areas that still call for keen attention involve mobile payments, digital currencies, peer-to-peer lending and marketplace lending, and underlying issues need to be more carefully addressed, that deal with the "the use of new technologies to solve regulatory and compliance requirements more effectively and efficiently" [7], p. 2 (or regtech) and with the recourse to innovative technology by supervisory agencies to support their activity (or suptech) [8].

As far as key players, most fintech innovations have been generated – and further fintech innovative solutions can be expected to emerge – outside the conventional financial and banking system. New applications developed by bright minds have been largely driven by non-bank entities, including venture capital-backed fintech start-ups and non-traditional providers of financial services that often focus their operations narrowly on a subset of the financial sphere of the economy: success stories abound in the area of digital payments, as fintech start-up companies have provided quick and convenient payment options, that encompass the adoption of e-wallets; they have been increasingly used for paying online purchases and for making person-to-person payments, thanks to intrinsic simplicity, not to mention strategies that have been designed to attract users by providing reward points, cash back and other exciting offers.

Very smart solutions that have been recently developed include those based on biometric sensors: their installation entails another step in the ATM innovation, as they are set to replace the need for carrying plastic cards and for remembering the

pin to get access to a bank account through the facility at issue; biometric ATMs use palm or fingerprint sensors, eye recognition and integrated mobile applications to identify the account holder, thus eliminating mistakes in recognizing authorized customers and granting them access even if their card has been lost. Challenges ahead encompass voice biometrics, that has already unveiled its multifaceted advantages for financial institutions and their counterparts on a significant scale, and behavioral biometrics, that allows banks to look at how consumers behave (for instance, on a mobile app or website) rather than using physiological characteristics, like fingerprints.

4. Financial institutions and AI

With fintech being more and more widely adopted, a major impact in the financial sector has been generated by leveraging some of the latest innovations that involve AI: financial institutions have started to resort to it in order to transform the customer experience by enabling frictionless, 24/7 customer interactions while saving on costs; certain AI use cases have been increasingly disseminated within the financial industry, especially by banks, that are estimated to be offered the greater cost saving opportunities by front- and middle-office applications. A case in point has to do with the recourse to chatbots that have been used for a while, not only in the banking industry, and that allow to conduct an online chat conversation via text or text-to-speech, as a cost-effective alternative to direct contact with a live human agent.

Unquestionably, AI has the potential to upgrade bank management by making operations and processes faster and safer, with their efficiency set to increase as a result, which leads to consider the "intelligent" bank as a reliable candidate to become the rule – rather than remaining the exception – sooner than expected. Further progress can be foreseen in the financial industry, as AI applications are not just limited to retail banking: not only they are set to positively impact every office at banks, but these applications can support all financial services providers to completely redefine how they work, how they deliver innovative services and how they transform customer experiences; to stress this point, even though consideration tends to be focused on front-office operations, the back- and middle- offices of investment banks and other financial institutions can also benefit from AI, as shown by the full range of channels to get usefully involved in this innovative wave, encompassing front-office (conversational banking), middle-office (anti-fraud) and back-office (underwriting).

While the number of financial institutions that avail themselves of AI technology is on the rise, the ones that will achieve successful implementation are those that can develop comprehensive strategies: they can help to sense, comprehend, act and learn, therefore envisaging a system that can perceive the world around it, analyze and understand the information it receives, take actions based on that understanding and improve its own performance by learning from what happened; these strategies can help to drive growth in banking and financial services, in sight of a more sustainable and inclusive financial system, which our global village needs and deserves, now more than even, due to the troublesome and persisting effects of the Covid-19 health emergency. It is noticeable that several trends in digital engagement have accelerated during this pandemic and the gloomy picture to be confronted with should push financial institutions to take advantage of AI technology as "the foundation for new value propositions and distinctive customer experiences", to compete successfully and thrive [9].

5. Focus on virtual assistants

Virtual assistants can be considered the most conspicuous way in which AI has modernized so far – and can still upgrade – the financial system, adding to the human version of these assistants: as shown by the more and more intensive reliance on chatbots, they have attracted the attention of financial institutions, as well as of firms across a wide range of other economic sectors, and are being viewed as a key ingredient to create differentiation in today's increasingly crowded landscape; the underlying technology includes application programming interfaces that allow to analyze data, as well as web- and mobile-based user interfaces, and to deliver the necessary insights to the end customer. No wonder that forward-looking financial institutions have taken a leap of faith by investing in digital assistants to make "contextual insights" available to the right persons at the right time and through the preferred channels [10].

AI makes a huge difference between chatbots and virtual assistants who are typically self-employed workers specialized in providing administrative services to clients while operating outside their offices: these independent contractors usually work from a home office; access is granted to them to the necessary documents remotely, which acts as a stimulus to explore the potential of these assistants in the post-pandemic scenario. Since working from home has become more accepted for both workers and employers, the demand for skilled virtual assistants can be assumed to grow and new opportunities are surfacing for virtual assistants who are skilled in social media, content management, graphic design, blog writing, bookkeeping and web marketing [11].

To make a long story short, one of the advantages of hiring a virtual assistant is the flexibility to contract for just the services that each employer needs. Actually, this type of worker has become prominent, as small businesses and start-ups have embraced the trend to rely on virtual offices to keep costs low and firms of all sizes keep increasing their use of the Internet for their daily operations: being virtual assistants classified as self-employed workers, a company willing to take advantage of their services would not have to grant the same benefits it would be requested to provide its employees with; furthermore, since virtual assistants work offsite, they are expected to arrange and pay for their own toolkit (for instance, computer equipment, high-speed Internet connection and commonly used software programs) and it should not even be accounted for workspace, including a desk, at the company's office.

6. Digital assistants versus chatbots

The trend towards increasing digitalization has allowed "intelligent" versions of virtual assistants – known as Intelligent Virtual Assistants, shortly IVAs – to proliferate: they can be defined as digital personal software-based agents that assist us in performing our daily activities and are conceived as being "similar to personal human assistants that, let's say, take down notes during a meeting, remind us to tend to our 'to-do-lists,' or read messages and emails sent to us" [12]; for instance, these virtual assistants can help us to control and manage smart devices, that have become essential to operate in the areas of remote banking. Going into a few technical specifications, IVAs consist of "advanced conversational solutions – equipped with NLU (Natural Language Understanding), NLG (Natural Language Generation), and Deep Learning, that enables them to understand and retain context and have more productive conversations with users" [13].

Even though both chatbots and IVAs are ripened fruits of AI, a clear-cut distinction needs to be made between them, as a precondition for implementing them wisely and especially for taking full advantage of the added value that each of them can provide: chatbots may simulate a conversational experience to a certain extent but are ultimately constrained by having to work off a limited script, as they lack the ability to learn over time and to adapt to context; on the other hand, IVAs have the advanced capabilities to truly serve "assistants" to customers and can emulate human interaction while carrying out a wide variety of tasks to fulfill a user's requirements. Therefore, these two AI applications cannot be confused as one, as it often happens.

To all intents and purposes, chatbots are generally used as information acquisition interfaces, for instance to extract product details, whereas IVAs can assist in conducting business: if you ask chatbots for virtual assistance – for instance, to remind you of meetings, to manage your to-do lists and to take down notes – they get confused and tend to search for clarification by keeping asking the same questions; anyway, chatbots play a crucial role in customer service, as customers can usefully interact with them to satisfy specific needs, for example to gain product-related information or even book an appointment with the product manager. By contrast, IVAs utilize dynamic conversation flow techniques to "understand" human emotions, thus enriching communications with humans and hence covering a greater scope of action, which includes a wider range of tasks, such as those involving decision-making and e-commerce [14].

7. The potential of conversational AI

Despite the distinctive features outlined so far, both chatbots and IVAs are considered conversational interfaces, which organizations – including financial institutions – have recently started to actively and significantly deploy to automate their internal business processes. These applications provide incredible value, as they help to develop promising strategies that leverage AI, and are also impacting our personal lives to a remarkable extent: more and more frequently, customer service programs have been enriched by resorting to AI-powered software that makes "intelligent" customer – as well as employee – experiences available; to stress this point, it must be acknowledged that with conversational AI not only customers but also employees get the answers they need fast.

It's more than simple "if-then" logic, since conversational AI incorporates natural language to make human-to-machine conversations more like human-to-human ones: the outcome can be described in terms of increased customer engagement, continued trust and reliability in doing business, across all industries, and the ability to make the best thinkers and doers in any organization more productive; as a matter of fact, tech-savvy companies are building AI applications to augment business productivity, as well as to innovate business operations, with the ultimate goal being to help boost revenues. Therefore, more and more organizations are extending their efforts to identify additional areas to leverage AI and derive maximum value from it, by resorting to either chatbots or IVAs, as a viable alternative to utilizing both after identifying the right areas of application for each of them.

In general terms, conversational AI refers to technologies which users can talk to: these applications use large volumes of data, machine learning and natural language processing to help imitate human interactions, recognizing speech and text inputs, and translating their meanings across various languages; as far as the outcomes, the applications at issue help to build task-specific, channel-agnostic experiences by integrating data from various systems and channels (like SMS, Voice, WhatsApp

and Facebook Messenger), and to retool teams for operational efficiency by automating the known and handling off the unknown. However, experts tend to label conversational AI's current applications as "weak AI", whereas "strong AI" should focus on a human-like consciousness that can perform a wider field of tasks and solve a broader range of problems [15].

8. Evidence from the financial system

With conversational AI being still considered in its infancy, it is even too easy to foresee tremendous progress that can translate into more cost-efficient solutions for many businesses, including financial institutions: focusing on banks, they have been reportedly slow in adjusting to new technologies, since managers have traditionally proven reluctant to abandon tried and tested systems for untested advancements, and by the way investing in technological progress involves huge amounts of money, which would make the risk of failure extra high; however, the transition to "conversational banking" has begun on a global scale, thus persuading banks to increasingly view chatbots and IVAs as new age contact center executives. Actually, these institutions have been pushed to mark digital transformation as a top priority as they have faced competition from fintech start-ups that have engaged in providing faster and more convenient options to their traditional customers in the last few years [16].

Another relevant factor must be identified with the health emergency that has been caused by the global spread of the novel coronavirus since 2019 and that has made an increased need for online services to surface and accelerate right afterwards: according to the United Nations Development Programme (UNDP), "while the pandemic demonstrates the immediate benefits of digital finance, the disruptive potential of digitalization in transforming finance is immense" [17] and positive effects can be even expected as a contribution to sustainable development, especially to the achievement of the Sustainable Development Goals in the 2030 Agenda that was adopted by the United Nations (UN) in 2015 [18]; therefore, not only mobile payment technologies have transformed mobile phones into financial tools for billions and billions of people, but going digital has been positively impacting – and can further upgrade – both supply- and demand-side drivers that interact to ultimately deploy AI to advancing promising areas in the financial industry, such as those involving cryptocurrencies, peer-to-peer lending and crowdfunding, to mention just a few of them. In line with valuable research work by the Organization for Economic Cooperation and Development (OECD), another innovative field to be closely scrutinized is populated by the so-called robo-advisors, that are computer programs designed to generate investment advice according to customer data and that tend to be utilized "as a cheap alternative to human wealth advisors" [19], p. 12.

Not to miss any opportunity, it is worth analyzing the financial system as a whole, beyond the boundaries of the banking sector, which leads to shed unprecedented light upon insurance companies. To support this view, even a quick look at most recent literature can be a source of useful insights to emphasize the potential of the wide range of AI use cases in the market segment that they make up: this almost 300-year old industry has been relatively slow to react to the disruption brought about by the digital age but the rapid pace of technological innovation and changing customer expectations in the last few years have contributed to substantial improvements, with insurtech start-ups playing a key role not only to put forth innovative AI applications in the industry under examination, but also to force traditional insurance players to follow suit; as a matter of fact, AI can be applied to the insurance value chain via a number of entry points, to encompass many areas

(such as product development, marketing and sales, underwriting and risk-rating, claims management, robo-advisory, process improvements and recruitment, besides customer service) [20].

9. Success stories

Accordingly, success stories have unfolded in the insurance industry to learn from, in order to contribute to advances in the financial sphere of the economy, with their valuable repercussions in the real one not to be underestimated. A case study that showcases useful implications deals with Allianz Taiwan Life Insurance Co. Ltd.: it wanted a mobile assistant solution that could work across platforms to better serve customers; using IBM Cloud and IBM Watson Assistant, the company created an AI-powered virtual assistant that is described as being "smart, secure and almost human" and that was forged to field 80 percent of its most frequent customer requests, to provide "real help in real time" [21].

Turning to the banking industry, it is interesting to look at UBank, a digital-only bank established in 2008 and headquartered in Sydney, Australia, that has been able "to shrink time to market" by building a loan app virtual assistant on IBM Cloud platform: after consulting with an IBM Watson and Cloud Adoption Leadership team, this bank launched several initiatives, including RoboChat, a virtual assistant that incorporates advanced technology to support the bank's home loan application form online and particularly to help customers apply for home loans; to see the benefits of IBM Cloud technology at work, UBank and an IBM Garage team selected an initial use case, focusing on the bank's efforts to attract interest in its home loan offerings. Rather than relying solely on an email campaign, this bank built an app that plugs into Facebook and lets customers refer Facebook friends to the home loan program to be promoted and essentially RoboChat has been set up as an additional staff member providing a specific set of skills within this bank's current live chat capability [22].

Another revealing case study involves Banpro, that was founded in 1991 to support the social and economic development of Nicaragua and is part of the banking group Grupo Promerica, with nine operating banks throughout Central America. In an effort to scale exceptional always-on customer service, this bank launched Finn AI's virtual assistant technology in February 2018 and full functionality is being supported in Spanish, the primary language required to serve Banpro's Central American audience: within just one year, this virtual assistant has been able to complete 91% of chats without the need for a human customer service agent and to resolve 80% of customer queries, freeing up human customer service agents' time to deal with more complex customer inquiries; the virtual assistant at issue is not just handling queries from existing customers, as a great impression is being created on new prospects that engage with it and ultimately become new customers, with most common questions from them being about eligibility, product features and the application process [23].

10. Unprecedented challenges and opportunities

Success stories encourage to proceed with investing – money, as well as time and efforts – in technological innovation, not only in the financial industry. Challenges and opportunities ahead include the recourse to sound branding (also known as sonic branding, audio branding and acoustic branding) as a strategic tool for financial services companies to communicate with customers: by tradition, money

has been a visual and physical entity but financial institutions are now getting involved in technological progress that should help them become recognizable audio brand entities as well; the mass adoption of smart speakers with voice assistants that are designed to enable audio-search, command and transactional capabilities has widened the spectrum of channels through which consumers can interact with brands and is pivoting service technology firmly in the direction of audio [24].

A recognizable and reassuring sounding brand that people can hear and easily associate with the services provided by a bank is likely to help build trust and engagement, to be undoubtedly considered relevant in the financial industry more than in any other sector. As a reinforcement, it can be argued that brand engagement is reportedly far stronger when audio is treated as an equal and essential aspect of the brand: therefore, it makes sense that quite a number of financial institutions are already harnessing the power of a well-designed sonic strategy to boost their brand; looking far beyond the solitary sonic logo, these institutions are creating holistic systems of branded sound and music that are flexible and anticipate proof for the technological advances of the future [25].

Among the frontrunners, HSBC launched its "sound identity" in 2019, a year after refreshing its visual brand identity to focus on its hexagons in a bid to make its brand more consistent: a bespoke piece of music was chosen to help people instantly recognize this bank and was proposed as the "next natural phase", with the marketing team cooperating with the digital team to get the audio in the bank's apps [26]; one of the major motivations was to reduce the fragmentation of HSBC's brand and the audio generated a brand score that could be used across multiple experiences, both online and offline, to create a universal brand identity through sound, at a time when consumers are increasingly busy and distracted [27]. By the way, recent developments have even enabled smart speakers to be adopted for voice-activated banking and as we march forward into a post-Covid era, that should be ever more screenless, the role of sound is set to become ever more important for the industry under scrutiny (and beyond).

11. Conclusions

To conclude, technological progress and changing consumer habits bring about unprecedented challenges that even lead to question how banking brands can retain trust while physical currencies tend to disappear and real, human interactions seem to increasingly belong to the past. At the same time, valuable opportunities keep emerging, that are worth taking: although there is less human contact, interactions can be more personable through tailoring the experience around the customer; as shown by the recourse to a brand's "hymn", the sound of this experience can play an important part both functionally and emotionally.

It's no secret that technology keeps evolving. For instance, IVAs hold extensive capabilities to help revolutionize banking: the critical focus is to identify the right areas to deploy these AI applications to, as well as to leverage chatbots; compared to IVAs, they are said to lack "understanding" of human emotions but chatbots that can gauge human sentiments are now being developed with the help of AI emotional intelligence.

All in all, AI can be considered a game changer in the financial arena, as well as in the real sphere of the economy, and also has the potential to contribute to the 2030 Agenda that was set up by the UN to provide a shared blueprint for partnerships for peace and prosperity for people and the planet: accordingly, a broad approach should be assumed to give due credit to the digital transformation that is spreading on a global scale and that preludes to creating inclusive digital economies

as non-negotiable; factors to be further investigated range from technological advances that keep stimulating progress in the financial industry (especially in the delivery of banking and financial services) to the efforts under way to deploy AI to build the post-pandemic "new normal" as a stepping stone to a "new future". Anyway, a mental shift still stands as a precondition for meeting the challenges that raising the bar of intelligence over time implies and for taking the underlying opportunities.

Conflict of interest

The author declares no conflict of interest.

Author details

Margherita Mori
Department of Industrial and Information Engineering and of Economics, University of L'Aquila, L'Aquila, Italy

*Address all correspondence to: margherita.mori@univaq.it

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